Anthropometric measurements in Down's syndrome children during preschool period - Part II

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Vol. 11, No. 1 (2007-10 - 2007-12)

Curr Pediatr Res 2007; 11 (1 & 2): 21-24

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Key words: Anthropometry, Down's syndrome

Accepted June 17 2007

Abstract

The present study was conducted to find out the difference in the weight, height, upper segment, lower segment and armspan of Down's syndrome children compared to controls in the preschool period. All the above said parameters were significantly lower in cases compared to the controls. However; when grouped into age groups, the weight of these children was significantly decreased in 0 to 24 months in case of males, while in females between 9 to 24 months only. Height, upper segment and armspan measurements were significantly decreased in 0 to 9 months age group in male children. Among female children only upper segment was significantly decreased in 9 to 24 months age group.

Introduction

Growth retardation in Down's syndrome children is observed throughout the growing period and particularly more noticed in the preschool children (1).This growth retardation is reflected in physical and mental development of Down's syndrome children. In the earlier study we discussed some of the anthropometric parameters in children with Down's syndrome compared to normal. In the present study, we analyzed weight, height, upper segment, lower segment and armspan in Down's syndrome children.

Material and Methods

Twenty children whose age ranged from 0 to 36 months with karyotype confirmed Down's syndrome (Trisomy-21) by Ikaros Meta system; Germany formed the subject for the current study. Of the twenty children ten were males; and the remaining females. These children were compared with the age and sex matched controls (1:5) who visited the under five clinic of Pediatrics Out patient wing for the purpose of regular immunization. All children, both cases and controls were screened for factors framed in inclusion and exclusion criteria of the study sample. Children with other congenital abnormalities, chromosomal/ non chromosomal involvement, and congenital cardiac anomalies were excluded from the study. Anthropometric measurements were recorded based on the guidelines framed by Hall et al (2) in cases of Down's syndrome and normal children. The measurements in the present communication include weight, height, upper segment, lower segment and arm span. The results were tabulated and analyzed using unpaired t test.

Results

Among the various anthropometric measurements, weight was significantly decreased in children with Down's syndrome compared to the controls in both sexes. This significance was particularly seen in the age group of 0 to 24 months in male and 9 to 24 months in female children (Table 1). Height was significantly decreased in cases compared to controls. When they were grouped into various age groups, it was significant only in male children below 9 months of age. No significant difference in height was found in female cases compared to controls in all age groups. (Table 2).Regarding upper segment measurements, it showed significant difference between cases and controls, and the significance was particularly observed in 0 to 9 months age group of cases in male and 9 to 24 months age group of cases in females. (Table 3).Regarding Lower segment measurements, it was significantly different between cases and controls; but when we saw the age specific difference we didn't find any significant difference (Table 4).Arm span was significantly decreased in cases compared to controls and it was particularly significant in the 0 to 9 months age group of males (Table 5).

Discussion

In the present study, decreased weight gain was noted from the early infancy and continued after that in males, but in females this decrease was observed only in the late infancy. Moreover, none of the cases showed gain in body weight similar to controls and they were consistently lower throughout. This contradicts the observations of Piro et al (3) who observed that the weight remains elevated from 0-12yrs in males while only in the last two years in females. However, our finding is in agreement with the findings of Clementi et al who noted decreased weight gain in the affected compared to controls (4).

Height was significantly decreased in Down's syndrome children compared to controls in earlier studies (1, 4-8). Our findings are consistent with the findings of earlier studies. Moreover, a statistically significant decrease of height in cases of males < 9 months in the present study agrees with the findings of Sachdev et al (9), who are of the opinion that growth curve for height was below 50th percentile of the normal in the first nine months and subsequently below 10th percentile thereafter in both sexes. Height of female cases in our study didn't show any significant difference in any of age group. This contradict the findings of Sachdev et al, who noted that compared to the normal children, Down's syndrome children took almost one and half times extra to attain particular height.

Regarding the increase in height, it was observed by earlier workers, that normally gain in height is mainly due to the growth in limbs than the trunk in the prepubertal age (10, 11); earlier studies revealed that reduction in height in Down's syndrome children is mainly due to the failure of growth of lower limb (6) and retardation in sitting height of Down's syndrome children is not much compared to standing height (1). In the present study, the decrease in the height in male cases of Down's syndrome in 0 to 9 months age group may be due to the combinations of (a) a statistically significant decrease in the height of upper segment plus (b) a less marked decrease of the lower segment. The upper segment measurement was significantly decreased in females of 9 to 24 months age group, wherein the height between the cases and controls was not decreased significantly in all age groups. This is probably due to constant and sustained decrease of the rate of growth of trunk which occurs at a faster rate than that of a lower limb. Our findings suggest that there is overall reduction of height in Down's syndrome unlike the previous authors (1, 6, 10, and 11) who observed more reduction in the growth of lower limbs.

Regarding the arm span measurement our finding is supported by the findings of Mohanty et al (12); who stated that, arm span is strongly correlated with the standing height. In the present study significant decrease in the arm span in 0 to 9 months age group of male Down's syndrome children associated with the significant decrease in height in the same age group.

All the anthropometric parameters, showed significant reduction in cases compared to controls. This significance difference may be due to the retarded growth potential in Down's syndrome children.

Table 1: Weight (mean in kgs ± SD) in cases and controls

Age group	Male			Female		
	Cases	Controls	P-Value	Cases	Controls	P-Value
0 to 9 months	4.55 ± 1.38	6.52 ± 1.298	0.0019*	4.8 ± 1.44	5.62 ±	0.242

					1.397	
9 to 24 months	6.93 ± 1.102	9.27 ± 1.474	0.02*	5.58 ± 1.859	8.75 ± 1.334	0.005*
24 to 36 months	10.5 ± 0.000	12.74 ± 1.590	-	9.5 ± 0.000	12.36 ± 0.61	-
Total study group	5.86 ± 2.29	7.97 ± 2.44	0.014*	5.58 ± 2.03	7.55 ± 2.55	0.025*

* P – Value is significant.
Mean (in Kgs ± SD) in cases - 5.72 ± 2.111
Mean (in Kgs ± SD) in control - 7.76 ± 2.494
'P' Value - 0.009 #1645;

Table 2: Height (mean in Cms ± SD) in cases and controls

Age group	Male			Female		
	Cases	Controls	P-Value	Cases	Controls	P-Value
0 to 9 months	60.17 ± 4.491	65.12 ± 5.158	0.0359*	58.3 ± 4.102	61.4 ± 5.284	0.2278
9 to 24 months	69.5 ± 7.263	76.07 ± 5.833	0.1401	68.87± 8.29	75.26 ± 7.02	0.1199
24 to 36 months	86 ± 0.000	91.7 ± 4.830	-	86.5 ± 0.000	91.7 ± 1.204	-
Total study group	65.55 ± 9.691	71.06 ± 10.01	0.1156	65.35±10.64	69.98±11.40	0.242

* P – Value is significant.
Mean (in cms ± SD) in cases - 65.45 ± 9.906
Mean (in cms ± SD) in controls - 70.519 ± 10.688
'P' Value - 0.0525 #1645;

Table 3: Upper segment (mean in Cms ± SD) in cases and controls:

Age group	Male			Female		
	Cases	Controls	P-Value	Cases	Controls	P-Value
0 to 9 months	38.75 ± 3.078	41.62 ± 3.016	0.0415*	38.1 ± 2.133	39.63 ± 3.33	0.337
9 to 24 months	42.33 ±	45.98 ±	0.0640	39.87±	46.63 ±	0.009*

	3.786	2.747		3.07	4.48	
24 to 36 months	50.5 ± 0.000	52.5 ± 2.884	-	54 ± 0.000	54.1 ± 3.96	-
Total study group	41 ± 4.738	44.01 ± 4.502	0.060	40.4 ± 5.363	43.88 ± 6.12	0.1003

* P- Value is significant.
Mean (in cms ± SD) in cases - 40.7 ± 4.935
Mean (in cms ± SD) in controls - 43.946 ± 5.348
'P' Value - 0.0135 *

Table 4: Lower segment (mean in Cms ± SD) in cases and controls:

Age group	Male			Female		
	Cases	Controls	P-Value	Cases	Controls	P-Value
0 to 9 months	21.43 ± 1.941	23.48 ± 2.630	0.080	20.2 ± 2.253	21.57 ± 2.75	0.306
9 to 24 months	26.83 ± 5.346	30.09 ± 4.554	0.2850	29 ± 5.598	30.14 ± 5.67	0.716
24 to 36 months	35.5 ± 0.000	39.20 ± 1.986	-	32.5 ± 0.000	39.2 ± 1.99	-
Total study group	24.46 ± 5.475	27.04 ± 6.002	0.214	24.95 ± 6.23	26.76 ± 7.12	0.457

*P – Value is significant.
Mean (in cms ± SD) in cases- 24.705 ± 5.175
Mean (in cms ± SD) in controls- 26.518 ± 5.967
'P' Value- 0.0021 *

Table 5: Armspan (mean in Cms ± SD) in cases and controls:

Age group	Male			Female		
	Cases	Controls	P-Value	Cases	Controls	P-Value
0 to 9 months	58.41 ± 4.66	64.22 ± 5.22	0.016*	56.3 ± 4.76	60.21± 5.12	0.126
9 to 24 months	67.67 ± 9.648	67.67 ± 8.154	0.99	68 ± 7.53	74.4 ± 6.98	0.112
24 to 36	86.5 ±	90.4 ± 6.259	-	81.5 ±	91.5 ± 2.29	-

months	0.000			0.00		
Total study group	64 ± 10.69	69.88 ± 9.733	0.091	63.5 ± 10.14	69.02±11.63	0.168

* P – Value is significant.
Mean (in cms ± SD) in cases - 63.75 ± 10.143
Mean (in cms ± SD) in controls - 69.45 ± 10.675
'P' Value - 0.0187 *

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