The relation between Changes in Body Mass Index (BMI) and linear growth in prepubertal children: Daily Weight Gain and BMI changes in Relation to Linear Growth During Nutritional Rehabilitation of Underweight Children

S Elsiddig, M Itani, C Jour, M Shaat, F Souieky, N Al-Naimi, A Soliman.
Department of Pediatrics, Dietetics and Nutrition, Hamad General Hospital, Doha, Qatar

INTRODUCTION

Early detection of abnormal weight loss in childhood may be important for preventive purposes.
Variable growth response to nutrition rehabilitation have been reported in children with failure to thrive (FTT) who do not have any chronic disease or due to different clinical and nutritional approach in their management.

Aim:

- ❑ To analyze the effect of different BMI and BMI SDS on linear growth (HtSDS).
- ❑ To studied the effect of weight changes on linear growth (HtSDS).

METHODS

- Cross sectional, children 1-9 yr. with abnormal Wt.
- Normal physical exam and routine labs (CBC, RF ,LFT, ESR, TFT).
- Children with chronic illness excluded.
- Anthropometric data reviewed & based on BMISDS categorized in to 4 groups:

			N	Age (Yr.)	Height SD	BMI SDS
Group 1 Moderate Severe under-Wt.	BMISDS <-2	Mean	19	4.97	-1.58*#	-2.85*#
		SD		4.4	1.36	1.01
Group 2 Mild under-Wt.	BMISDS >-2 <-1	Mean	33	5.6	-1.76*#	-1.51*#
		SD		4.0	0.92	0.28
Group 3 (Controls)	BMISDS >-1 <2	Mean	20	3.1	-1.26#	-0.29#
		SD		2.75	0.97	0.54
Group 4 (Obese)	BMISDS >2	Mean	30	8.97	1.03*	3.55*
		SD		3.90	0.97	0.91

*= P< 0.05 groups vs controls (Group 3),
= P < 0.05 groups vs obese group (Group 4)

RESULTS

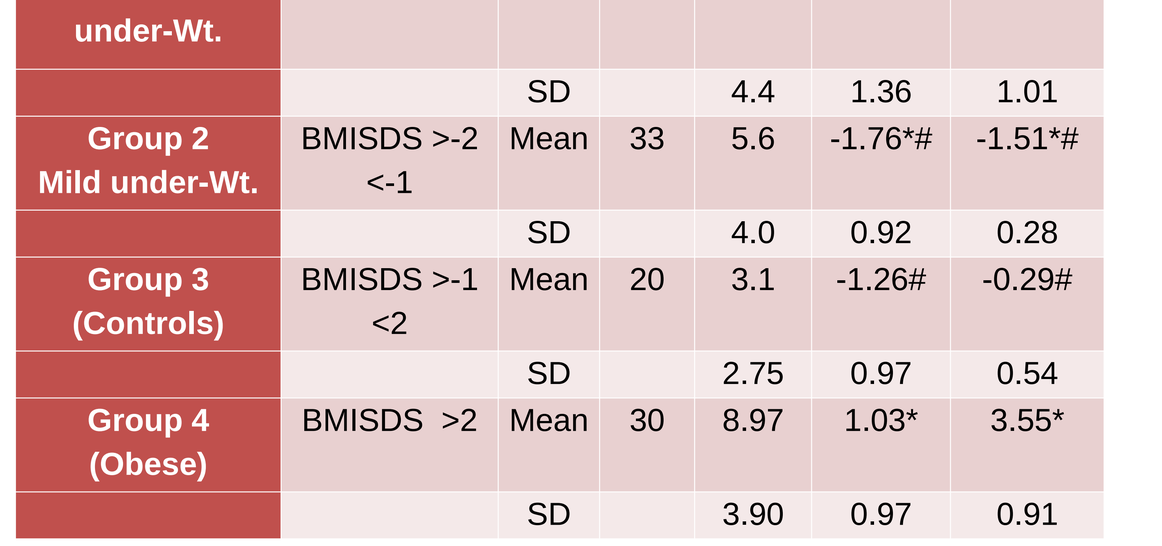
- Obese children had the largest HtSDS (1.03 +/- 0.9) while children with BMISDS (< -1) were significantly shorter (HtSDS = -1.7 +/- 0.9) compared to the other groups.
- 49% treated children with BMISDS (< -1) exceeded average normal Wt. gain for age during nutritional rehabilitation.
- 60% increased BMISDS and 43% increased HtSDS at end of 1 year.
- Linear regression showed a significant correlation between BMISDS and HtSDS supporting the notion that proper nutrition and maintaining normal BMISDS is essential for adequate gain in height.
- Inadequate compliance with NR can explain the failure to achieve the proper weight gain during nutritional rehabilitation

CONCLUSION

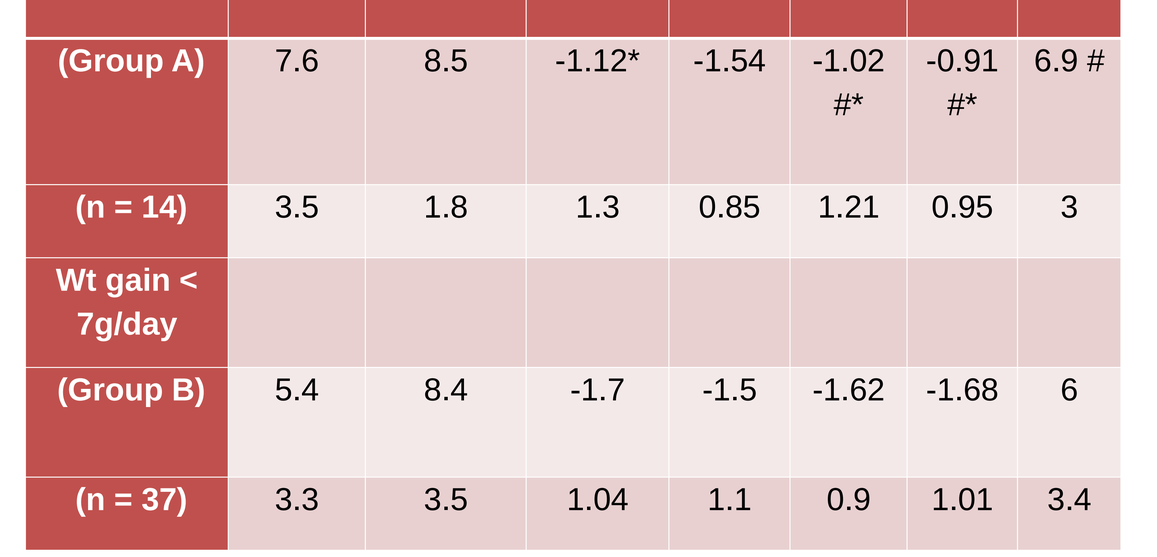
- BMISDS is clinically useful to detect the effect of changes in Wt. on linear growth and monitor nutritional management.
- More intensive interference including hospital admission and/or tube feeding may be required in undernourished children who fail to gain adequate weight during nutritional rehabilitation at home.

Wt. gain > 7 g /day	Age (yr.)	Duration of NR	Ht. SDS1	BMI SDS1	Ht. SDS2	BMI SDS2	GV Cm/y
(Group A)	7.6	8.5	-1.12*	-1.54	-1.02 #*	-0.91 #*	6.9 #
(n = 14)	3.5	1.8	1.3	0.85	1.21	0.95	3
Wt gain < 7g/day							
(Group B)	5.4	8.4	-1.7	-1.5	-1.62	-1.68	6
(n = 37)	3.3	3.5	1.04	1.1	0.9	1.01	3.4

*p=<0.05 group A vs group B
#p = <0.05 after vs before nutritional rehabilitation (NR).
1 = after 4 months, 2 after 9 months



Regression analysis of BMISD score on Height SD score , (R = 0.723, P < 001) (n =470)



Correlation between growth velocity (cm/y) and weight gain g/day (R=0.4, P=0.02) .

Ashraf Soliman MD PhD FRCP Department of Pediatrics
Hamad General Hospital Doha, Qatar,
Atsoliman@yahoo.com

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Growth and syndromes (to include Turner syndrome)
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