

GROWTH RATES OF PRESCHOOL CHILDREN IN BURSA, TURKEY A Pilot Study

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Medical workers responsible for nursery infants have been handicapped by the absence of any local standards of weight and height against which to assess nutrition in Turkey.

Although studies have been made in this field in the United States,¹ Great Britain,^{2,3,4,5,10} Mexico,⁶ and in many other

TABLE I
ACTUAL MEAN WEIGHTS AND STANDARD DEVIATION (WITH S. E.)
OF BURSA (TURKEY) MERINOS CRÈCHE CHILDREN, 1953-1959.

Age	B O Y S			G I R L S		
	No.	Mean Wt. Kg.	S.D.Kg.	No.	Mean Wt. Kg.	S.D.Kg.
2 Months	67	4.450 ± 0.10	0.82	83	4.100 ± 0.075	0.68
3 "	77	5.000 ± 0.095	0.86	96	4.650 ± 0.075	0.70
4 "	68	5.500 ± 0.105	0.92	92	5.050 ± 0.080	0.79
5 "	63	5.950 ± 0.120	0.93	83	5.500 ± 0.090	0.82
6 "	59	6.400 ± 0.125	0.96	73	5.750 ± 0.100	0.88
7 "	59	6.950 ± 0.125	0.96	63	6.250 ± 0.110	0.88
8 "	65	7.300 ± 0.140	1.13	69	6.650 ± 0.125	1.02
9 "	60	7.550 ± 0.155	1.20	68	6.900 ± 0.105	0.87
10 "	59	7.800 ± 0.165	1.28	65	7.300 ± 0.110	0.88
11 "	57	8.150 ± 0.145	1.11	56	7.500 ± 0.120	0.90
12 "	67	8.450 ± 0.110	0.90	68	7.850 ± 0.100	0.93
1 1-2 Years	70	9.750 ± 0.130	1.19	59	9.250 ± 0.140	1.10
2 "	70	11.300 ± 0.150	1.24	52	10.550 ± 0.200	1.46
2 1-2 "	51	12.750 ± 0.200	1.42	29	12.150 ± 0.210	1.12
3 "	59	14.000 ± 0.200	1.46	42	13.400 ± 0.250	1.64
3 1-2 "						
4 "	50	15.350 ± 0.270	1.90	40	14.950 ± 0.340	2.43
4 1-2 "						
5 "	42	17.350 ± 0.350	2.23	26	16.400 ± 0.410	2.08

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** From the Crèche, Merinos Textile Factory, Bursa.

countries,⁸ it is obvious that these standards cannot be directly applied to Turkish children due to differing nutritional, genetic, and other factors. However some Turkish pediatricians⁷ have used the Mexican figures as standards by which to compare Turkish children feeling that they were closer to Turkish norms than the others available. To satisfy this need for specifically Turkish standards a pilot study of 416 Turkish children was made in Bursa. It is hoped that this will form the basis for a wider review in the future.

TABLE 2

MEAN HEIGHTS AND STANDARD DEVIATION (WITH S. E.) OF BURSA (TURKEY) MERINOS CRÈCHE CHILDREN, 1953-1959.

Age	B O Y S			G I R L S		
	No.	Mean Height cm.	S.D.cm.	No.	Mean Height cm.	S.D.cm.
2 Months	67	57 ± 0.375	3.08	83	56 ± 0.270	2.48
3 "	77	59 ± 0.330	2.91	96	59 ± 0.260	2.56
4 "	68	61 ± 0.340	2.81	92	61 ± 0.260	2.52
5 "	63	63 ± 0.360	2.84	83	63 ± 0.280	2.54
6 "	59	66 ± 0.300	2.34	73	65 ± 0.300	2.55
7 "	59	67 ± 0.230	1.78	63	67 ± 0.310	2.50
8 "	65	69 ± 0.320	2.58	69	68 ± 0.280	2.34
9 "	60	70 ± 0.395	3.04	68	69 ± 0.250	2.05
10 "	59	71 ± 0.410	3.11	65	70 ± 0.205	1.65
11 "	57	71 ± 0.340	2.55	65	71 ± 0.340	2.55
12 "	67	73 ± 0.280	2.31	68	72 ± 0.250	2.08
1 1-2 Years	70	78 ± 0.440	3.59	59	77 ± 0.400	3.04
2 "	70	82 ± 0.450	3.71	52	81 ± 0.490	3.52
2 1-2 "	51	88 ± 0.460	3.21	29	87 ± 0.460	2.46
3 "	59	91 ± 0.500	3.83	42	89 ± 0.620	3.98
3 1-2 "						
4 "	50	95 ± 0.650	4.60	40	95 ± 0.690	4.34
4 1-2 "						
5 "	42	102 ± 0.535	3.43	26	101 ± 0.860	4.30

In 1953 a well-organized and equipped crèche was established by the Merinos Textile Factory in Bursa for the children of its women workers. Two doctors (including one pediatrician), one dentist and several nurses take care of the children. Women workers may leave children of from two months up to six years of age in the crèche during working hours. The children are bathed and fed and the older ones are taught on kindergarten lines. The mothers are permitted to come to breast-feed their infants every three hours. The

babies and children are either breast-fed, with or without supplementary meals, or entirely fed by the clinic, free of charge, during the eight to nine hours period.

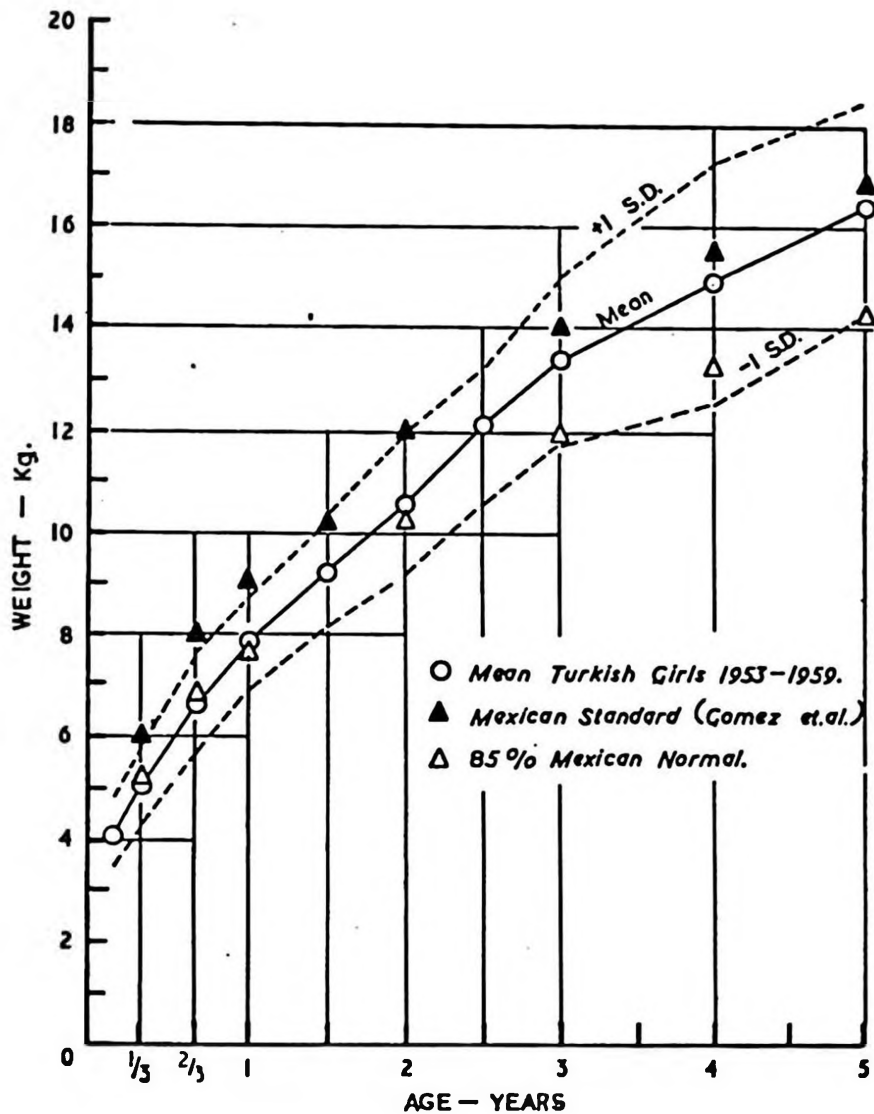


Figure 1.

Among the observations recorded are the height and weight of all children, the babies being test-weighed before and after each feeding. Weights are recorded every day for those being breast-fed; after weaning, weights are recorded every week up to the age of one year and then every month. Children under two are weighed naked, older ones are weighed wearing shorts. Height measurements are recorded every month. Babies who are not able to stand are measured with a special ruler while lying on a bed; older children are measured with the child standing in his stocking feet with heels close together, and heels, buttocks and occiput against a firm vertical support incorporating a measuring rod.

Measurement of mother's milk intake reveals whether or not it is sufficient for the baby. One hundred and fifty grams per kilogram per day is accepted as an adequate amount. Babies who do not receive this amount are given supplementary feedings of curdled or diluted cow's milk, yogurt, rice pudding with milk and five per cent sugar, vegetable soup and fruit juice. After six months of age one egg yolk twice a week is added to this diet. At one year approximately 30-40 grams of grilled, minced meat is offered each day. When the babies reach two years of age they are fed a half portion, equivalent to 850-900 calories,⁹ of the worker's meals.

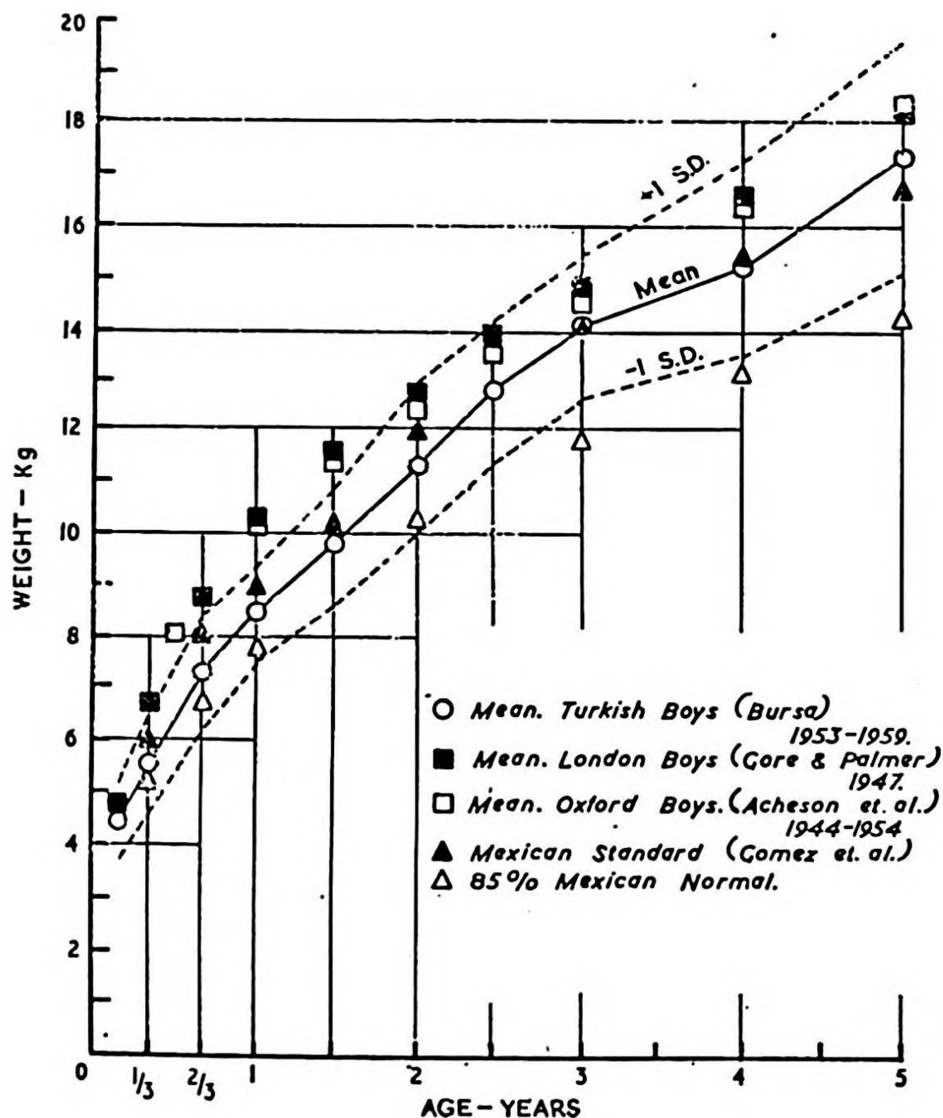


Figure 2

Calories are provided as follows: from two to six months of age 100-110 calories-kilogram-day; from seven to twelve months 90-100 calories-kilogram-day; from one year to three years 80-90 calories-kilogram-day; and after three years 70-80 calories-kilogram-day.

The mothers work eight hours a day and are paid 115-117 kuruş per hour (approximately 13-20 cents per hour). They eat one meal, of approximately 1,600-1,800 calories, a day free of charge.

Among the children in the crèche, 12 cases of measles, 4 of whooping cough, 4 of chickenpox, and 5 other minor illnesses were recorded during a period of five years.

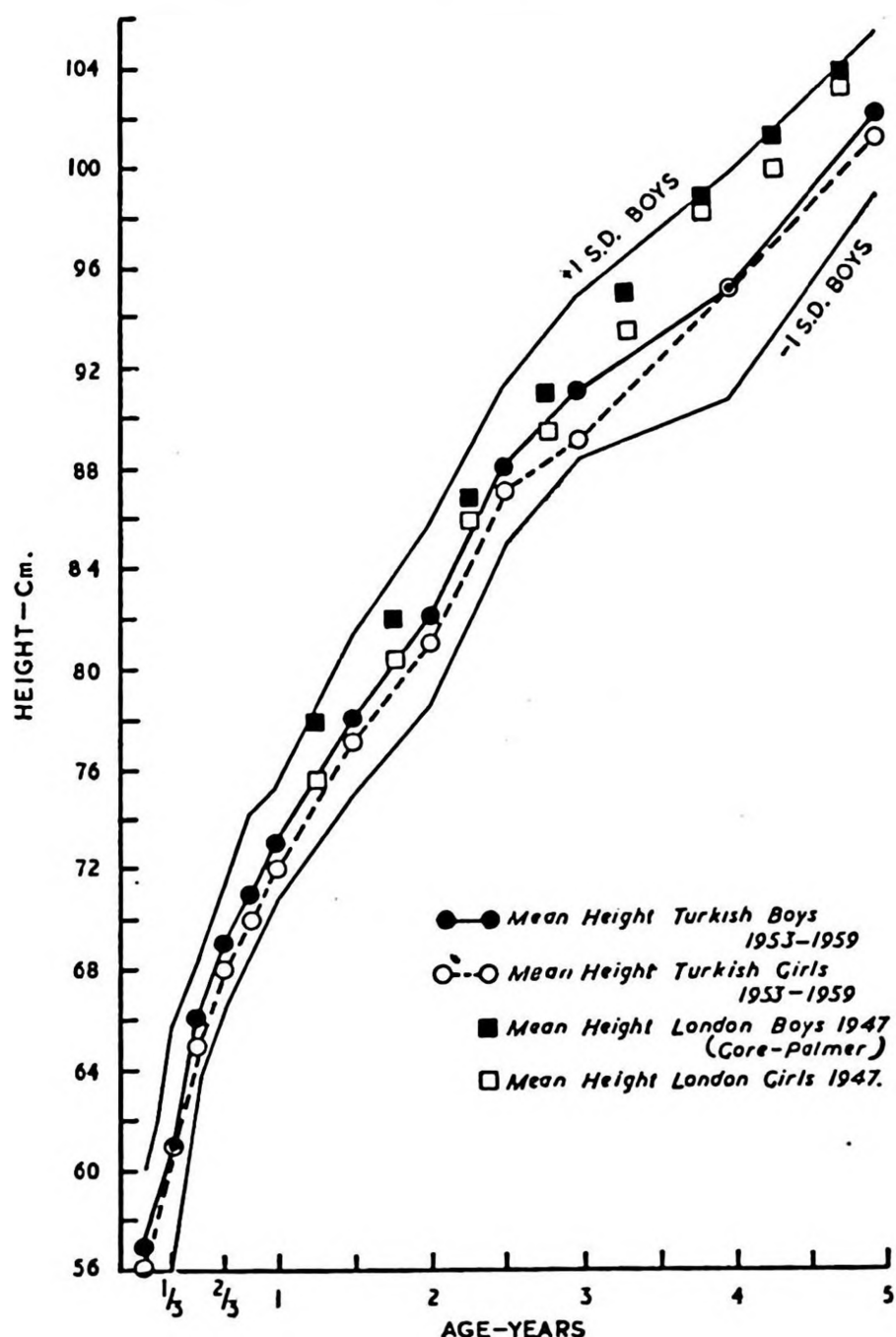


Figure 3.

Anthropometric Results and Discussion

This is a partly longitudinal growth study, in which 54 of the height and weight records are single observations: 273 children

were measured 2-6 times, 78 children between 7 and 11 times, and 49 children between 12 and 17 times.

Tables 1 and 2 show the actual ages, average weight and height of boys and girls, with standard deviations and errors. It may be seen that there are significant differences between boys and girls. In all groups 68 per cent of all observations lay within -1 and $+1$ standard deviation and more than 95 per cent of them lay within -2 and $+2$ standard deviation.

Figures 1,2 and 3 show the comparison of height and weight curves of Turkish children and children from London (1947), Oxford (1944-54), and Mexico. The U. K. standard of weights is considerably higher than the Turkish at all ages. The Mexican weight standard is above the Turkish until after two and a half years of age, and then the Mexican and Turkish curves coincide. But at the age of five years the Mexican standard curve is below the Turkish curve.

This growth study is continuing and the figures are increasing every year. It is hoped that after several years more complete and more valuable figures will be obtained.

Summary

A partly longitudinal growth study of 416 Turkish infants was carried out. This study was based on the records of the Bursa (Turkey) Merinos Textile Factory Crèche.

The mean values, with standard errors and standard deviations, of the weight and height of Turkish boys and girls are shown in the tables.

The Turkish figures are compared with those from the U. K. and Mexico.

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REFERENCES

1. Nelson, W.E.: Textbook of Pediatrics, W. B. Saunders Co., Philadelphia, 1954.
2. Gore, A. T., and Palmer, W. T.: Growth of the preschool child in London, *Lancet*, 1:385, 1949.
3. Acheson, R. M., Kemp, F. H., and Parfit, Jessie.: Height, weight and skeletal maturity in the first five years of life, *Lancet*, 1:691, 1955.
4. Low, A.: Growth of children, University of Aberdeen, 1952.

5. Grant, M. W.: Technique for the analysis of height and weight data in tropical countries, Mimeograph, 1951, Applied Nutrition Unit, London School of Hygiene and Tropical Medicine.
6. Gomez, F., Galvan, R. R., Gravioto, J., and Frenk, S.: Malnutrition in infancy and childhood, *Advances in Pediatrics*, VII, Levine, S. Z. Editor, Yearbook Publishers, 1955.
7. Dogramaci, İ., and Wray, J. D.: Severe infantile malnutrition and its management, *Turkish J. Pediat.*, 1:129, 1959.
8. Lewis, J. B.: A study of the health of a pre-school age-group in an African urban community, *J. Trop. Pediat.*, 5:10, 1959.
9. Köksal, O.: A study on breast-feeding in Turkey, unpublished data, 1960.
10. Polani, P. E.: Height and weight chart for boys and girls Medical Research Unit, National Spastics Society, Department of Child Health, Guy's Hospital, London.