
ORIGINAL ARTICLE

Heights and Weights of Preschool Children
Visiting the MCH Clinic of the General
Hospital (RSUPP), Medan *

by

LEMAN SEMBIRING, LEONARD NAPITUPULU and S.M. MANOEROENG

(Department of Child Health, Medical School University of
North Sumatera, Medan)

Abstract

The average height and weight of 4,082 children visiting the General Hospital (RSUPP), Medan, throughout 1969 - 1974 were higher than that reported by Sukonto et al. (1939). However, the heights and weights of school children at 5 to 6 years as reported by Hartaman et al. (1973) were higher than our findings in this study. Compared with the U.S. growth charts the height of these children was very close to the 10th percentile, while the weight was between the 3rd and the 10th percentile of the Harvard standard. At birth the average weight was very close to the 50th percentile of the Harvard standard, at one year it was very close to (below) the 10th percentile, while at 2 - 5 years it was slightly above the 3rd percentile.

* Presented at the Second Asian Congress of Pediatrics, Jakarta, 3 - 6 August, 1976.
Received 13th. Nov., 1976.

Introduction

Data on height and weight measurements are of practical importance for the assessment of growth of children. They established the relationship between higher socio-economic levels and growth rates. For instance, well-nourished Africans, Japanese, Chinese, Filipinos (WHO, 1969), Turkish (Neyzi et al., 1973), etc. approach remarkably close to U.S. standards. Growth rates in different areas within a country enable comparison of the overall nutritional situation in the areas in question (WHO, 1969).

This study was carried out with the following objectives:

1. To find some parameters of growth (height and weight) of preschool children visiting the MCH clinic of RSUPP, Medan.
2. To compare these figures with available data in Jakarta, Indonesia (Sukonto, 1939) and western countries (Harvard standards).

Materials and Methods

A 6-year (1969 - 1974) retrospective study was made on 4,082 preschool children visiting the MCH clinic of RSUPP Medan, i.e. 222 (1969), 223 (1970), 693 (1971), 991 (1972), 1074 (1973), and 879 (1974). However, only 420 children (196 males and 224 females) had 4 or more visits in the groups recommended by the Western Pacific Region of the WHO, i.e. 12 months, 15

months, 18 months, 21 months, 2 years, 2½ years, 3 years, 3½ years, 4 years, 4½ years, 5 years, 5½ years and 6 years (WHO, 1969).

The heights and weights of the children who were able to stand steadily were measured with a Detecto beam balance scale equipped with height measurement. Younger children who were unable to stand steadily were weighed with a Detecto beam balance scale and their recumbent lengths were measured with the ordinary type of wooden measuring-staff. All of these measurements were done by 3 midwives, following the standard procedures of measuring weight and height as recommended by Jelliffe (1969). All cases were subjected to a brief physical examination. Subjects who showed signs of clear-out malnutrition were excluded from the group.

Most of the children were born in the Department of Obstetrics, RSUPP Medan, and had a birth certificate where the birth weight was also recorded. The remainder was born either in other maternity hospitals in Medan or at home; their birth weights were recorded according to interviews with the mothers. Only 378 out of 420 children were with birth weights, comprising 177 males and 201 females.

Results

The average birth weight of the 378 children, based on the birth certificate and interview with the mothers, was 3.27 kg. in male and 3.22 kg. in female

(Table 1) Table 1 further shows the average height and weight in the age group of 12 months, 15 months, etc. up to 6 years. The comparison of the height and weight of these children with those of Sukonto (1939) and the 10th percentiles of the Harvard standards is recorded in Tables 2 and 3, while the graphical comparison of these figures is shown in Figures 1 and 2.

TABLE 1: Height and weights of preschool children attending the MCH clinic by age and sex expressed in Mean and S.D.

Age group	Height in cm.		Weight in kg.			
	male	female	male	female	male	female
Birth	—	—	3.27	—	3.22	—
12 months	72.30 2.15	70.50 2.79	8.68 0.86		8.46 0.82	
15 months	77.34 3.44	74.62 2.80	8.93 0.97		8.55 1.00	
18 months	80.66 3.57	79.24 2.99	9.72 0.91		9.13 0.92	
21 months	82.66 3.66	81.00 3.37	9.95 1.11		9.68 1.11	
2 years	83.71 3.77	82.50 3.29	10.44 1.15		10.42 0.67	
2½ years	86.19 4.23	85.92 2.74	11.40 1.23		11.10 1.07	
3 years	91.01 3.40	90.13 4.07	12.46 1.25		11.96 1.57	
3½ years	94.56 4.22	94.47 4.67	12.82 1.11		12.98 1.43	
4 years	98.02 4.40	97.50 3.85	14.15 1.3.2		13.76 1.44	
4½ years	101.81 4.13	100.90 3.59	15.07 1.43		14.68 1.28	
5 years	103.60 4.70	102.31 3.70	15.98 1.42		15.03 1.59	
5½ years	106.52 4.15	105.70 4.84	16.50 1.27		15.98 2.03	
6 years	109.00 5.40	109.44 4.75	17.42 1.46		17.00 2.23	

TABLE 2: Comparative weights of preschool children in Medan, Jakarta (Sukonto 1939), and the 10th percentile of Harvard standards by age and sex

Age in years	M a l e			F e m a l e		
	Medan (1976)	Sukonto (Jakarta 1939)	10th perc. Harvard	Medan (1976)	Sukonto (Jakarta 1939)	10th perc. Harvard
1	8.68	8.1	8.89	8.46	7.6	8.55
2	10.44	9.6	11.2	10.42	9.3	10.66
3	12.46	11.4	13.02	11.96	11.0	12.52
4	14.15	13.0	14.56	13.76	12.6	14.15
5	15.98	14.4	16.1	15.03	14.2	15.79
6	17.42	15.8	—	17.0	16.2	—

TABLE 3: Comparative heights (cm.) of preschool children in Medan, Jakarta (Sukonto 1939), and the 10th percentile of Harvards by age and sex

Age in years	M a l e			F e m a l e		
	Medan (1976)	Sukonto (Jakarta 1939)	10th perc. Harvard	Medan (1976)	Sukonto (Jakarta 1939)	10th perc. Harvard
1	72.3	71.3	72.4	70.5	71.3	70.6
2	83.7	79.4	84.2	82.5	78.4	82.6
3	91.0	86.4	92.3	90.1	85.3	90.5
4	98.0	93.5	99.3	97.5	92.5	97.6
5	103.6	101.9	103.7	102.3	100.0	103.0
6	109.0	108.0		109.4	105.7	

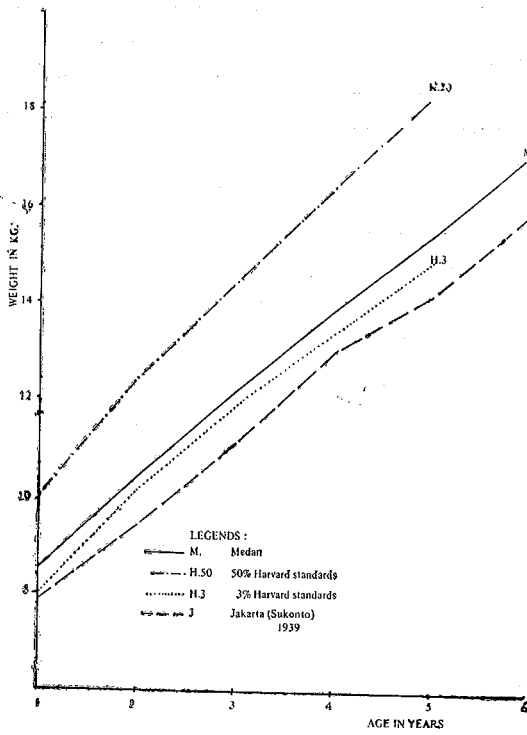


FIG. 1.

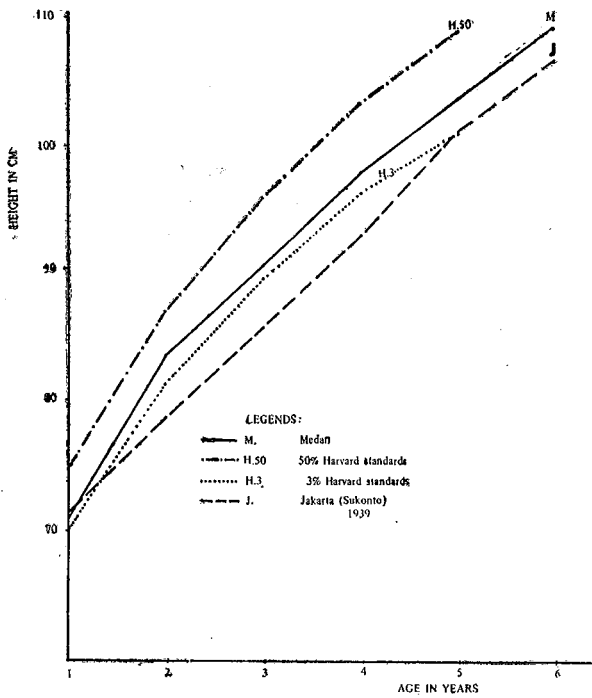


FIG. 2.

Discussion

The average birth weight of these children was similar to our previous study (Manoeroeng et al., 1974). The average height and weight of every age group were higher than those reported by Sukonto (1939) as shown in Tables 2 and 3 in both sexes. It was probably due to some improvement of nutritional situation or other environmental factors, because it is believed that the low height and weight values in developing countries are the results of environmental influences rather than genetic characteristics of the samples (Neyzi et al., 1973). However, heights and weights of the children as reported by Hartaman et al. (1973) were higher than our figures. Compared with the North American growth charts, the heights and weights of these children fell between the 3rd and 10th percentile of the Harvard standards (Nelson, 1975).

In affluent countries, the growth of the children is at the optimal rate. For instance, at one year of age the birth weight is tripled, at $2\frac{1}{2}$ years of age the birth weight is quadrupled, and at 5 years of age the weight at one year is doubled (Slobody and Wasserman, 1968). However, in our case the weight at one year of age was less than three times the birth weight, at $2\frac{1}{2}$ years of

age it was less than 4 times the birth weight, and at 5 years of age it was less than twice the weight at one year. In other words, the growth curve is flatter than that of western countries.

At birth the average weight was very close to the 50th percentile of the Harvard standard, at one year it was very close to (below) the 10th percentile, while at 2-5 years it was slightly above the 3rd percentile. This probably means that our preschool children did not attain their optimal growth, since any given physical measurement usually follows a constant percentile channel in the course of healthy growth (Slobody and Wasserman, 1968). The average gain in height in American children is about 12 cm. in the 2nd year, while during the 3rd, 4th, and 5th year of life it is about 8-6 cm.

In our material, however, the average height gain in the 2nd year of life was slightly lower than that of the American children, i.e. 11.7 cm. In the 3rd, 4th and 5th year of life it was also slightly lower than that of the American children, i.e. 7.5 cm., 7.2 cm. and 5.2 cm. respectively. The height of these children was approximately higher than that of Sukonto (1939), except at 1 year of age in the females which was 70.5 and 71.3 cm. respectively.

REFERENCES

1. HARI...; AZHALI, M.S. and HENDRA, : Body weight and height of school children in Bandung. Paediatr. Indones. 13 : 293 (1973).
2. JELLIFFE, D.B. : The assessment of the nutritional status of the community. W.H.O. Monograph series no. 53, Geneva (1969).
3. MANOEROENG, S.M.; SEMBIRING, L. and TARIGAN, Sj. : Growth and development of infants in the first year of life. Konika III, Surabaya, Indonesia (1974).
4. NELSON, W.A. : Textbook of Pediatrics 10th ed., p. 13 (Saunders, Philadelphia 1975).
5. NEYZI, C.; YAICINDAG, A. and ALP, H. : Heights and weights of Turkish children. Environ. Child Health 19 : 5 (1973).
6. SLOBODY, L.B. and WASSERMAN, E.: Survey of clinical pediatr. 5th ed. (McGraw-Hill, New York 1968).
7. SUKONTO : The growth of children of preschool age in Batavia. Indian J. Pediatr. 6 : 163 (1939). Cited from Kumpulan Kuliah Ilmu Kes. Anak, FKUI, jilid I, cetakan ke-II (1974). In Indonesian Language.
8. The Health Aspects of Food and Nutrition; a manual for developing countries in the Western Pacific of the W.H.O., Manila (1969).