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SKELETAL AND PHYSICAL DEVELOPMENT OF GHANAIAN CHILDREN IN ACCRA

ABSTRACT — A total of 2192 children (1110 girls, 1082 boys) age-range between 0—19 years were X-rayed at the lower left hand and wrist and anthropometrically examined at the Mamprobi Policlinic in Accra in 1977 for the collection of the data on skeletal, physical growth and development i.e. the taking of height, weight, head and chest circumference measurements.

In comparing the trends in physical growth and development of Accra, school children since Ofosu-Amaah--Katzaki's published data of 1969/70 in 1973 with our 1977 data analysis the following results are discernible:

1. Both sexes in 1969/70 data gained 143 cms. while those of 1977 commanded 210.93 m . cms. in standing heights i.e. the 1977 children (both boys and girls) were 67.83 cm taller than the 1969/70 children.

2. The weight gains (Tab. 3) in both sexes in 1969/70 data showed a total of 84.9 mean kilograms within the various age-groups which, when compared with those of 1977 i.e. 96.64 m . kilograms is 11.74 m. kilograms more than the 1969/70 data.

3. The periods of great spurt among the male and female age-groups are:

Boys — 0—8 years 6.8 m . cms. per year
9—12 years 4.1 m . cms. per year and
13—19 years 3.3 m . cms. per year
Girls — 0—8 years 6.7 m . cms. per year
9—12 years 5.0 m . cms. per year and
13—19 years 3.0 m . cms per year.

These compare favourably with other studies conducted in Ghana and other parts of Africa including Euro--American countries but the younger age-groups i.e. 0—8 years both boys and girls did far better than some of them in great growth spurt because of constant and longer breast-feeding periods including better improvements in health and nutritional status of the selected school children at Mamprobi in Accra, whose parents command better socio-economic status than those of children of Chorkor also in Accra (Agbenu 1982). The environmental influences, whether good or bad, play a great role in human growth and development in all respects.

4. The grades of skeletal maturation (0—5 points for round carpal bones and 0—10 points for long bones-epyphysis) have been determined and the mean curves also assessed. Detail results of the skeletal variants and the maturation in the hand and wrist, scored according to Sugiura-Nakazawa (1968) will be published soon.

KEY WORDS: skeletal development — children — Ghana — Accra.

INTRODUCTION

Up-to-date physical growth and skeletal development data on Chanaian children are sparely few: Weiner J. S. and Thambipillai (1952) "Skeletal Maturation of West-African Negroes in Accra", Waddy, B. B. (1956) "Heights and Weights of children in the Northern Territories of the Gold Coast". Agbenu, E. and Grimm, H. (1956/67) and Agbenu (1969—1982) "Physical growth and Development of Chanaian School Children", Fiawoo, D. K. (1968) "The Social Environment and Heights and Weights of Ghanaian Children", Asante, R. O./Amankwa, S.G.K. (1971) "Physical Growth Patterns of Peki

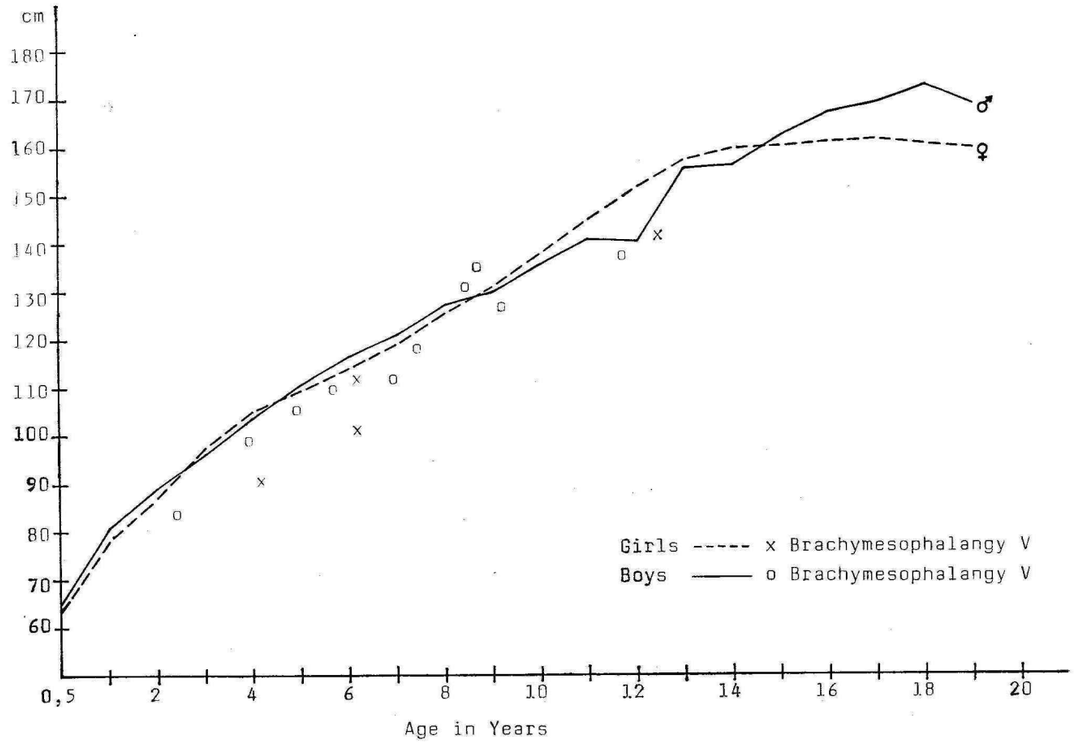


FIGURE 1a *Standing Height (1977).*

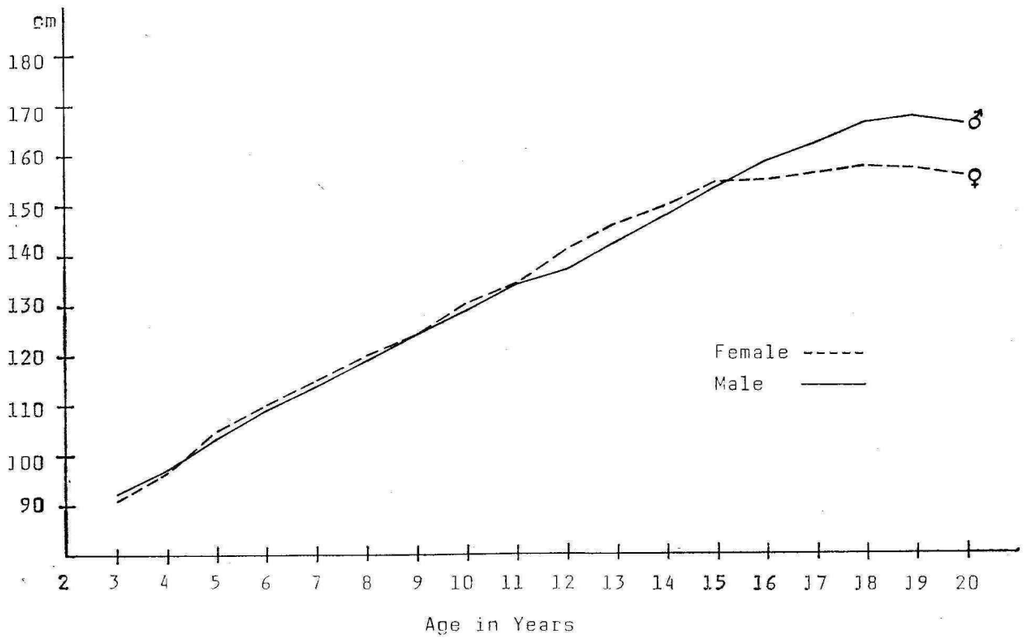


FIGURE 1b *Standing Height (1973)*

School Children", Ofosu-Amaah/Katzarski (1973), "The Growth Pattern of School children in Accra", and yet another joint research report on skeletal and physical development of Ghanaian children in Accra (1977/79) have been added to the bush of child growth and development by Drs. E. Agbenu, T. Nakamura, and Profs. S. Ofosu-Amaah, and Yasuo Sugiura to make the forest of physical growth and development study on both Ghanaian children and adults grow.

The aims of the present study have been to establish the standard bone age of Ghanaian children based on their prevailing nutritional status and its future improvement; to analyse the skeletal variants in the development of bones in the hand and compare two races (Ghanian and Japanese children) by using Sugiura-Nakaguara's method of scoring skeletal maturation in the hand and wrist from X-ray-films; to provide further information concerning physical growth and development of Accra children.

MATERIAL AND METHODS

With the above aims in view, we present part of our findings from the last mentioned study which was originally conducted at Mamprobi Policlinic and based at the Department of Community Health in the University of Ghana Medical School (data now housed at the Noguchi Medical Research Institute — Legon) for further indepth study which will enlarge our knowledge in the study of human biological sciences.

TABLE 1a. *Standing Height in cm (1977)*

Age in Yrs.	Male			Female		
	No.	Mean	S. D.	No.	Mean	S. D.
0.5	55	65.5	6.24	50	64.0	5.95
1	54	80.8	6.35	50	78.3	5.06
2	59	89.9	0.4	50	87.9	5.59
3	61	95.8	4.31	50	97.0	6.43
4	61	103.9	5.83	50	103.9	4.89
5	51	110.5	5.00	50	109.5	4.52
6	51	116.6	5.43	50	113.7	4.95
7	56	120.5	5.14	50	119.6	5.18
8	52	127.5	6.52	50	125.6	4.59
9	62	129.5	4.57	50	130.3	6.64
10	73	135.3	6.62	67	137.5	7.05
11	60	140.0	5.99	56	143.8	7.34
12	57	144.0	8.09	65	150.5	7.83
13	51	154.5	4.18	54	154.5	6.11
14	47	155.2	9.91	71	156.3	6.78
15	53	160.3	9.67	87	159.0	7.28
16	54	166.1	7.76	74	159.3	5.31
17	67	167.9	7.75	52	160.6	5.33
18	44	170.8	8.07	42	160.8	5.14
19	16	167.9	4.95	27	159.6	5.77

TABLE 1b. *Standing Height in cm (1973)*

Age in Yrs.	Male				Female			
	Number	Mean	S. D.	S. E.	No.	Mean	S. D.	S. E.
2.5—3.4	67	92.4	3.90	0.47	102	91.2	4.50	0.44
3.5—4.4	177	97.5	4.60	0.34	135	96.2	5.00	0.43
4.5—5.4	220	104.1	4.80	0.32	217	104.6	5.80	0.39
5.5—6.4	228	109.5	5.20	0.34	166	110.1	5.10	0.39
6.5—7.4	215	114.1	5.70	0.38	194	114.8	5.20	0.37
7.5—8.4	216	119.4	5.80	0.39	214	120.1	5.70	0.38
8.5—9.4	204	123.9	6.20	0.43	209	123.7	5.60	0.38
9.5—10.4	196	129.4	6.80	0.48	184	130.1	6.90	0.50
10.5—11.4	217	134.1	7.20	0.48	197	134.3	7.90	0.56
11.5—12.4	255	137.5	6.50	0.40	201	141.1	9.70	0.55
12.5—13.4	190	142.5	8.40	0.60	211	146.3	7.40	0.50
13.5—14.4	208	147.7	8.50	0.58	197	150.2	7.30	0.52
14.5—15.4	242	153.3	8.80	0.56	207	153.6	6.10	0.42
15.5—16.4	202	158.5	8.40	0.59	208	155.0	6.50	0.45
16.5—17.4	209	162.0	9.80	0.67	191	156.1	6.30	0.45
17.5—18.4	175	165.5	7.40	0.55	191	156.2	5.60	0.40
18.5—19.4	154	167.4	6.00	0.48	113	157.3	6.10	0.57
19.5—20.4	93	166.1	6.80	0.70	87	156.2	5.50	0.59

In all, a total of 2192 children (1110 girls, 1082 boys) age-range between 0—19 years were X-rayed at the lower left hand and wrist and anthropometrically examined for the collection of the data on skeletal, physical growth and development studies (i.e. height, weight, head and chest circumference measurements were taken).

The trends in physical growth and development of Accra School children since Ofosu-Amaah-Katzarski's published data 1969/70 in 1973 are hereby compared with our present data analysis, minus the detailed reports on skeletal maturity findings (see *Fig. 1*), which will be published later on. The methods used in the collection and analysis of our data were conform with the B. P. Handbook No. 9 and the paediatric stages of childhood development (Population Bulletin-World of children, vol. 33 No. 6, 1979) (see *Tables 1-4*).

Early Results:

Tables 1-4 indicate the mean velocities in standing height, weight gains, and increases in head and chest circumference measurements of the individual age-groups. The 1977 data are compared with 1969/70 data. Ghanaian children's skeletal maturity in round (carpal bones) and long bones is assessed according to the following grades of development and growth.

Round Bone (Carpal Bone):

0. The center is not visible.
1. Primitive rounded center. But more developed than 0.
2. Still smoothed rounded surface but more developed than I.
3. Beginning to form its own shape and slight concave and convex parts in the surface.
4. More developed in forming its shape and surface articulation with the adjacent bone beginning to become distinct.
5. Completely developed. The bones are partially covering each other.

Epiphysis of Long Bone:

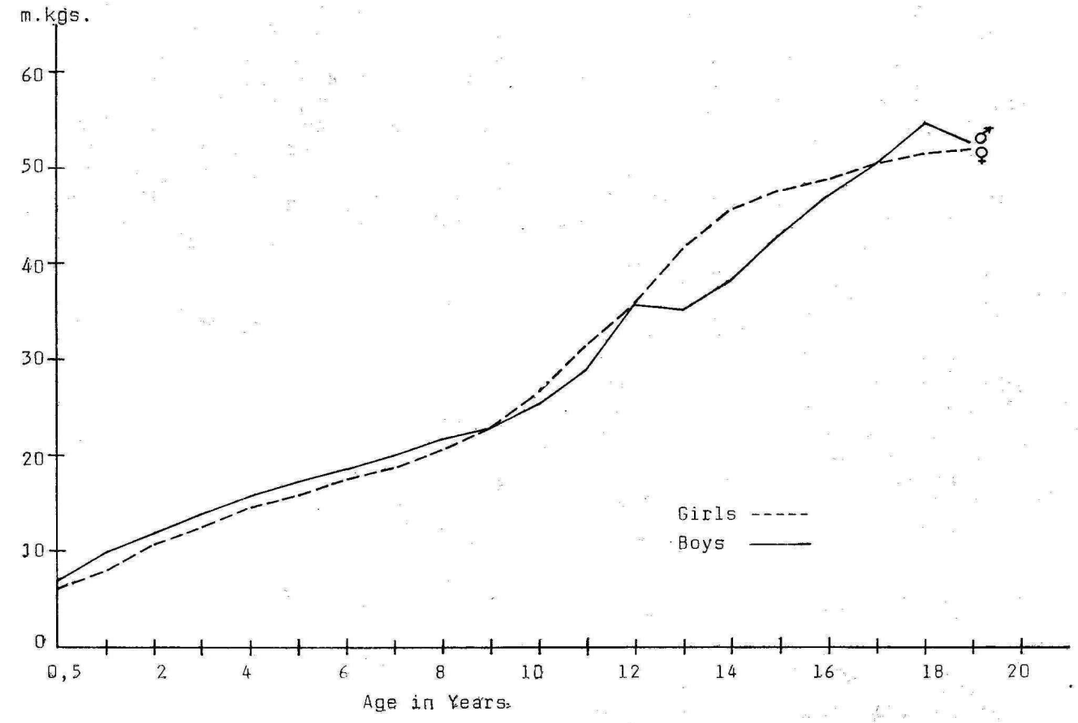
0. The center is not visible.
1. The center is distinct in appearance (visible as a single deposit of calcium or primitive rounded center).
2. More developed than I, but not yet forming its own shape.
3. Beginning to form its own shape.

TABLE 2a. *Weight in Kgs* (1977)

Age in Yrs.	Male			Female		
	No.	Mean	S. D.	No.	Mean	S. D.
0.5	55	7.2	1.66	50	6.6	1.71
1	54	10.2	2.04	50	8.9	1.84
2	59	12.2	1.66	50	11.7	1.71
3	61	14.7	1.39	50	13.7	2.11
4	61	16.4	5.28	50	15.8	1.73
5	51	17.7	2.09	50	16.9	2.06
6	51	19.7	2.44	50	18.4	2.10
7	56	20.0	2.40	50	19.5	2.05
8	57	22.4	3.00	50	21.5	2.97
9	67	23.8	2.97	64	23.8	4.19
10	73	26.7	3.67	67	27.6	4.11
11	60	29.2	3.97	56	32.2	5.71
12	57	37.3	5.00	66	36.2	6.15
13	51	35.0	4.87	54	42.4	7.52
14	47	39.3	8.49	71	46.2	8.54
15	53	44.8	7.97	87	48.6	6.29
16	54	48.2	7.84	74	49.5	6.46
17	67	51.8	6.73	52	51.25	6.84
18	44	55.3	7.15	42	52.3	7.19
19	16	54.6	5.74	27	53.4	9.76

TABLE 2b. *Weight in Kgs (1973)*

Age in Yrs.	Male				Female			
	Number	Mean	S. D.	S. E.	No.	Mean	S. D.	S. E.
2.5—3.4	67	14.3	1.46	0.17	102	13.8	1.39	0.13
3.5—4.4	177	15.4	1.68	0.12	135	15.2	1.77	0.15
4.5—5.4	220	17.2	1.96	0.13	217	17.1	2.13	0.14
5.5—6.4	228	18.8	2.14	0.14	166	18.6	2.41	0.16
6.5—7.4	215	20.5	2.71	0.14	194	20.0	2.63	0.18
7.5—8.4	216	22.4	3.29	0.22	214	22.3	2.94	0.20
8.5—9.4	204	24.5	3.10	0.21	209	24.3	3.69	0.25
9.5—10.4	196	26.7	4.25	0.30	184	28.1	5.29	0.39
10.5—11.4	217	29.5	4.49	0.30	197	30.4	6.19	0.44
11.5—12.4	255	31.3	4.17	0.26	201	35.1	6.67	0.47
12.5—13.4	190	35.0	7.26	0.52	211	38.9	7.30	0.50
13.5—14.4	208	37.6	6.77	0.46	197	44.1	9.25	0.65
14.5—15.4	242	41.3	7.60	0.48	207	48.0	9.15	0.63
15.5—16.5	202	46.7	8.70	0.61	208	48.9	8.90	0.61
16.5—17.4	209	48.7	8.50	0.58	191	53.1	8.40	0.60
17.5—18.4	175	55.9	7.67	0.58	191	53.1	8.10	0.58
18.5—19.4	154	56.6	5.96	0.48	113	54.6	7.59	0.71
19.5—20.4	93	58.0	6.72	0.69	87	55.0	8.62	0.92



GURE 2a *Rate of Increase in Weight (1977).*

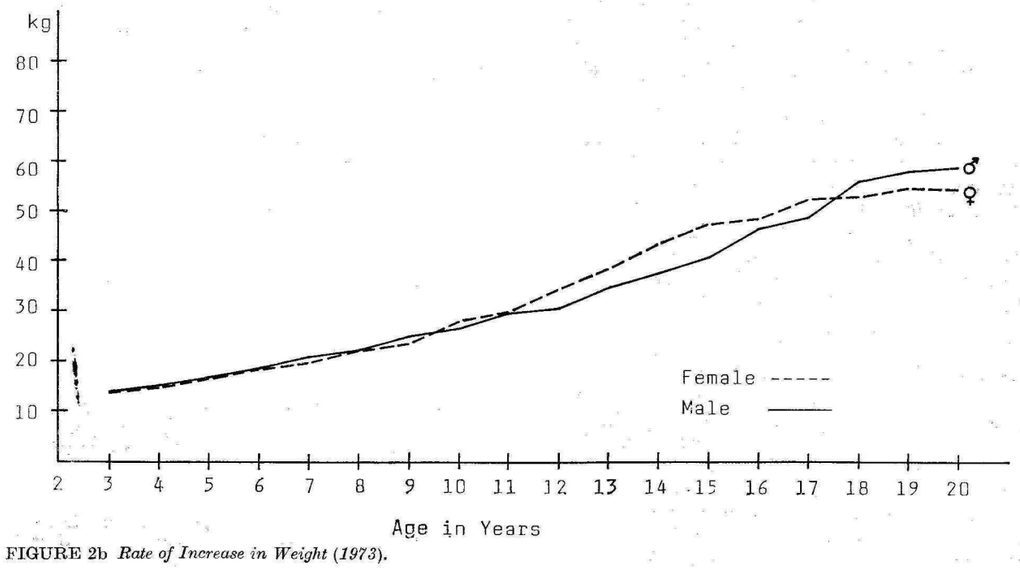


FIGURE 2b *Rate of Increase in Weight (1973).*

4. Concave and convex in the outline but the width of the epiphysis is lesser than that of the shaft.
5. The width of the epiphysis is the same as that of the shaft.
6. Beginning of "capping", but there is a gap remaining between the epiphysis and the shaft.
7. The gap has narrowed. The proximal and distal surface of the epiphysis one are parallel and zigzag shaped.
8. Fusion of the epiphysis and the shaft has began.
9. Fusion of the epiphysis and the shaft is completed but the line of fusion is still visible over the majority of its length.
10. The line of fusion has entirely disappeared (adult bone).

The boys' standing height (*Table 1*) analyses and comparisons within the age groups of 2—6 years of our data (26.70 mean cm) show that these groups are 15.00 mean centimeters taller than the age groups of 3—6 years of the 1969/70 data (11.70 mean centimeters) published by Ofosu-Amaah. The 1969/70 early school age-group of 6—12 years were only 4.40 cm taller than the 1977 boys. In the same vein, pre-pubescent boys i.e. of the 12—14 age group of the 1969/70 data were also 2.40 cm taller than the 1977 boys. Surprisingly the adolescent boys of 14—20 years of 1960/70 commanded 4.10 cm more than the 14—19 years age-groups in the 1977 data. The 1969/70 data did not include the children of the age-group of 0—2 years. This group cannot therefore be compared, but is presented within its own sex-group. The boys are 0.28 cm taller than the girls of the same age-group. The boys' age-group of 0—2 years gained a mean total of 28.18 cms while their girl counterparts scored 23.90 mean centimeters.

Looking at the girls stature of the age-group of 2—6 years of the 1977 data: they are 22.00 cm taller than the 1969/70 girls. But in the 6—10 years age-group, the 1969/70 girls commanded 5.80 cm more than the 1977 girls. In this same way, the girls of the age-group of 10—12 years (1969/70) were taller than the 1977 girls by 3.10 cm. With the girls' age-brackets of 12—19 years their standing height is 2.95 centimeters more than in the same group of 1969/70. On the whole both sexes in 1969/70 gained 143.10 m . cms. while those of 1977 commanded 210.93 m. centimeters in standing heights, i.e. the 1977 children (both boys and girls) were 67.83 cm taller than the 1969/70 children.

The weight gains (*Table 2*) in both sexes in the 1969/70 data showed a total of 84.9 mean kilograms within the various age-groups which, when compared with those of 1977, i.e. 96.64 kilograms, is 11.74 kilograms more than in the 1969/70 data.

Within the boys' individual age-groups the increases are not very great. The age-group of 3—6 years of the 1969/70 data is only 2.9 kgs as against 7.5 kgs of the 1977 age-group. The age-group of 2—6 years of 1977 had 4.60 kgs more increases over the other years' data. But in 1969/70 the age-group of 6—12 years weight of 12.3 is 5.30 kgs less than that of 1977 i.e. 17.6 kgs. This picture is different when the age-group of 12—14 years in 1977 gained 6.6 kgs as against 8.1 kgs of the 1969/70 data, which is a difference of 1.50 kgs less. This picture is again established within the 14—20 years age-group i.e. 20.4 kgs as against 16.0 kgs in 1977. There also is a difference of 4.40 kgs more for the 1969/70 data.

While the girls in 1977 gained 6.07 kgs, their counterparts in 1960/70 commanded only 3.3 kgs i.e. 3.4 kgs less. But in the 1969/70 data the age group of 6—10 years gained 13.2 kgs as against 9.06 kgs in 1977, which is also 4.24 kgs more than the present data. In the age-group of 10—12 years the girls' mean weight was 13.7 kgs i.e. 5.64 kgs more than in the same age-group in 1977. But the picture is changed with the age-group of the 12—19 years old girls who, in 1977 gained a mean weight of 16.55 kgs i.e. 5.65 kgs more over the same age-group as in the 1969/70 data. In all, the 1977 girls commanded 44.57 kgs including the 0—2 years age-group, as against 41.2 kgs of the 1969/70 girls i.e. 3.37 kgs more.

STANDING HEIGHT/WEIGHT GAINS ACCORDING TO STAGES OF CHILDHOOD GROWTH PATTERNS: 1973—1977

Physical Growth Patterns in 1973

Standing Height Acceleration in the Age-Groups

Boys' Age Groups

2. Preschool 3—6	= 11.7	m . cms.
3. Early school 6—12	= 42.0*	m . cms.
4. Pre-pubescent 12—14	= 13.6	m . cm.
5. Adolescent 14—20	= 19.7*	m . cm.
Total	77.0	

Girls' Age Groups

3—6	= 13.4*	m . cms.
6—10	= 29.7	m . cms.
10—12	= 15.9*	m . cms.
12—20	= 7.1	m . cms.
Total	66.1	

The boys were 10.9 cms taller than the girls in 1973, but not during the periods of the pre-school age of 3—6 years and the prepubescent of 12—14 years respectively.

Weight Increases in the Age-Groups in 1973

Boys' Age Groups

2. Pre-school 3—6	= 2.9	m . kgs
3. Early school 6—12	= 8.1	m . kgs
4. Pre-pubescent 12—14	= 12.3	m . kgs
5. Adolescent 14—20	= 20.4	m . kgs
	43.7	

Girls' Age-Groups

3—6	= 3.3*	m . kgs
6—10	= 13.3*	m . kgs
10—12	= 13.7*	m . kgs
12—20	= 10.9	m . kgs
Total	41.2	

The boys were 2.5 kgs heavier than the girls in 1973 but the girls gained more in weight than the boys during their pre-school (3—6), early school (6—10) and pre-pubescent (10—12) ages.

The asterisks (*) show the age-groups or periods when each male or female groups have gained more accelerations in height or weight.

Standing Height Acceleration in the Age-Groups

Boys' Age-Groups

1. Infant	0—2	= 24.18*	m . cm.
2. Pre-school	2—6	= 26.70	m . cm.
3. Early school	6—12	= 27.60	m . cm.
4. Pre-pubescent	12—14	= 11.20	m . cm.
5. Adolescent	14—19	= 15.60*	m . cm.
	Total	105.28	

Girls' Age-Groups

0—2	= 23.90	m . cm.
2—6	= 35.40*	m . cm.
6—10	= 23.90	m . cm.
10—12	= 12.80	m . cm.
12—10	= 10.15	m . cm.
Total	106.05	

The girls are 0.77 cms taller than the boys! But the boys were during their infancy (0—2), early school (6—12) and adolescent (14—19) years growth periods/ages taller in stature than the girls.
This may be due to measurement errors or trends in the right direction in the environment concerned.

Weight Increases in the Age-Groups — 1977

Boys' Age-Groups

1. Infant	0—2	= 5.0*	m . kgs.
2. Pre-school	2—6	= 7.5*	m . kgs.
3. Early school	6—12	= 17.6*	m . kgs.
4. Pre-pubescent	12—14	= 6.6	m . kgs.
5. Adolescent	14—19	= 16.0	m . kgs.
	Total	52.7	

Girls' Age-Groups

0—2	=	4.83	m . kgs.
2—6	=	6.07	m . kgs.
6—10	=	9.06	m . kgs.
10—12	=	8.06	m . kgs.
12—18(19)	=	16.55*	m . kgs.
Total		44.57	

The boys are 8.13 kgs. heavier than the girls in 1977, but the girls' domination in weight gains appeared during their pre-pubescent (10—12) years and insignificantly also in the adolescent (12—19) years period.

DISCUSSIONS

The pre-school girls of 3—6 years were in 1973 0.77 mean centimeters taller than their boy-counterparts, but in the early school age (i.e. 6—12) boys were 2.30 mean centimeters taller than the girls of the same age-group. The girls' pre-pubescent age--brackets 10—12 years were also 2.30 mean centimeters taller than the boys in the 12—14 age-group in 1973, contrary to those of the boys at the adolescent period of 14—20 years who were 11.60 mean centimeters taller than their girl-counterparts of the 12—20 years age-group. The boys overall acceleration over the girls in stature on the whole was 10.90 mean centimeters in 1973.

Although the girls appeared to gain more mean weight during their periods of growth and development (i.e. in pre-school — 3.3, early-school — 3.3, pre-pubescent — 13.7, adolescent — 10.9

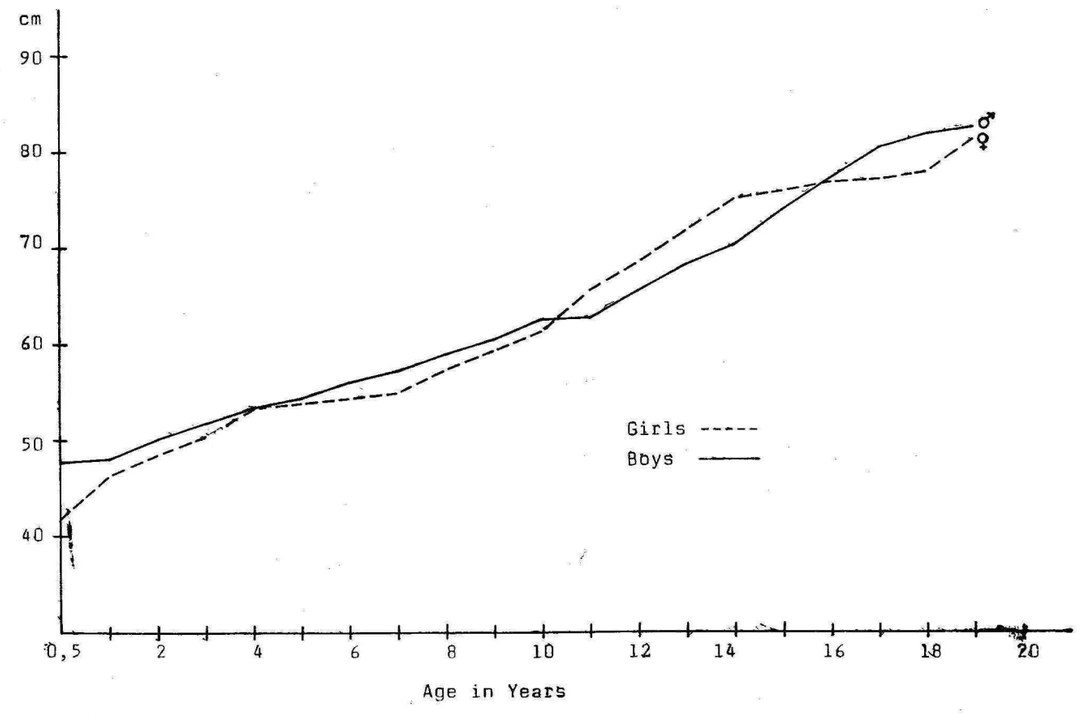


FIGURE 3. *Rate of Increase in Chest Circumference (1977).*

mean kgs) as against the boys — 2.9 (12.3) 8.1 mean kgs. The boys at the adolescent period (14—20) were 9.5 kgs heavier than the girls at the same period (12—20 years). The boys in their overall acceleration in weight gains were in 1973 by 2.50 m . kgs heavier than the girls because the girls stopped gaining weight at the adolescent period.

The height and weight acceleration in the 1977 data was also not clearly defined in the various age-groups. Out of this data analysis one finds from the boys' mean total of 24.18 mean centimeters of the 0—2 years age-group that, the infant-boys were 0.28 cms taller than the infant-girls (23.90 mean centimeters). The pre-school age-group (2—6 year) girls scored 35.40 mean centimeters i.e. they commanded 8.70 cms. more in height than the boys (26.70 mean centimeters). The early age-school boys (6—12 years) gained altogether 27.60 mean centimeters which is 3.70 mean-cm more than the girls (23.90 mean centimeters) of the same period (6—10 years). The pre-pubescent-girls (10—12 years) were only 1.60 mean centimeters more (i.e. out of a mean total of 12.80 centimeters) than the boys. At the adolescent period (14—19 years) the boys' standing height (15.60 mean centimeters) is 5.55 m . cms more than the girls' (10.05 mean centimeters) at the period of 12—19 years. But judging from the girls' overall standing height performances, i.e. 106.05 mean centimeters, as against the boys (105.28 mean centimeters), the girls were 0.77 mean centimeters taller than the boys.

TABLE 3. *Chest Cirumference in cm (1977)*

Age in Yrs.	Male			Female		
	No.	Mean	S. D.	No.	Mean	S. D.
0.5	55	47.5	3.38	50	41.6	3.50
1	54	47.8	3.06	50	46.3	2.71
2	59	50.6	2.28	50	49.4	1.85
3	61	52.4	2.19	50	51.2	2.62
4	61	53.7	2.36	50	54.4	2.14
5	50	54.8	2.30	50	54.4	2.54
6	50	56.3	2.89	50	54.1	2.86
7	56	57.9	2.75	50	55.6	3.29
8	52	59.9	3.50	50	55.7	2.81
9	62	60.7	2.53	64	59.5	3.34
10	73	62.1	3.20	67	61.8	3.19
11	60	63.9	3.31	56	65.5	4.77
12	57	65.1	3.74	66	68.1	4.80
13	51	67.1	4.26	54	72.3	5.03
14	47	70.9	5.92	71	75.3	5.56
15	53	74.7	5.33	87	76.5	3.79
16	54	77.8	5.71	74	77.7	4.50
17	67	80.4	4.45	52	77.8	4.09
18	44	82.4	4.74	42	78.9	3.73
19	16	83.4	4.78	27	82.0	6.56

TABLE 4. *Head Circumference in cm (1977)*

Age in Yrs.	Male			Female		
	No.	Mean	S. D.	No.	Mean	S. D.
0.5	55	43.4	2.69	50	42,1	2.77
1	54	47.4	1.69	50	40.0	1.53
2	59	49.2	1.77	50	47.9	1.47
3	51	57.9	1.37	50	55.6	1·74
4	61	51.1	1.78	50	51.3	2.09
5	50	51.4	1.31	50	50.4	1.64
6	50	51.9	1.48	50	51.5	1.63
7	56	52.0	1.11	50	51.2	1.40
8	52	52.6	1.65	50	51.5	1.53
9	62	53.1	1.85	64	52.0	2.19
10	73	52.3	1.56	56	52.4	5.25
11	50	53.5	1.63	56	53.1	2.11
12	57	54.0	1.55	66	53.8	1.66
13	51	54.9	1.65	71	55.5	3.05
14	47	54.7	1.69	54	54.4	1.82
15	53	55.9	2.62	87	55.1	1.66
16	54	56.1	1.83	74	55.2	1.70
17	67	56.6	1.74	52	55.1	1.41
18	44	56.9	1.71	42	54.5	1.80
19	16	55.2	2.18	27	54.6	1.64

The 1977 children were 67.83 m . cms taller and 11.74 m . kgs heavier than the 1969/70 children. This improvement in height and weight gains of the children at the Mamprobi Health Centre is an indication of better nutritional performance in this urbanised environment. Mamprobi is part of the Ablekuma District of Accra and has a population of 90.000 (1979 census) and it is mainly residential. (E. Agbenu, S. Ofosu-Amaah et al. 1978.)

SUMMARY AND CONCLUSION

A child's growth and development are powerfully influenced by differing diets, family structures child rearing practices, social and cultural activities of the environment, levels of opportunity and aspirations (Population Bulletin Vol. 33 No. 6). In our case (1977—81) in Ghana, the picture is not sharply different from above, but socio-economic problems

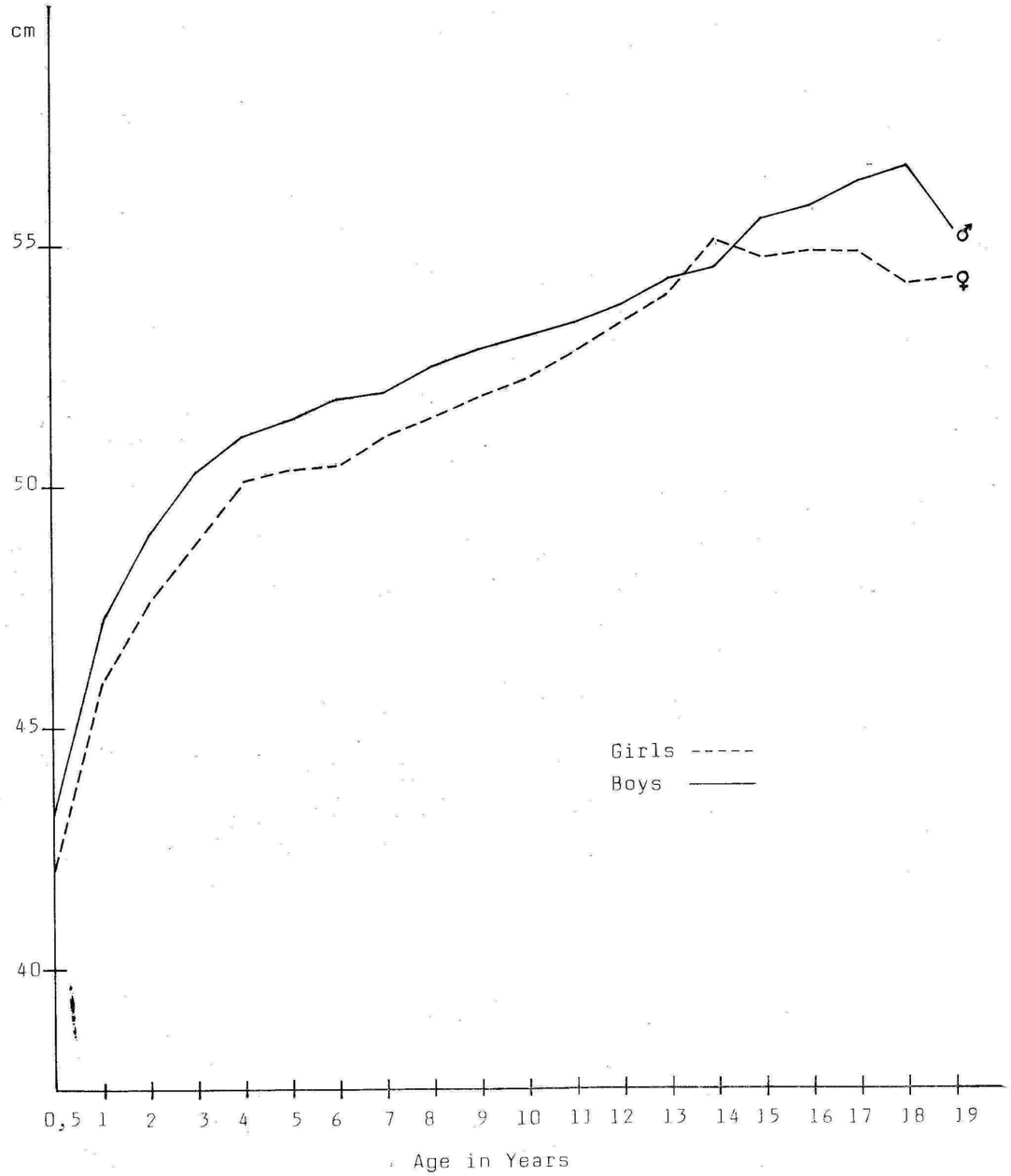


FIGURE 4. *Head Circumference (cm) (1977).*

both in the state apparatus and in individual families are getting increasingly worse as prices of bare nutritional necessities are increasingly escalating everyday, simply because of their non-availability in abundance in the markets and shops. Family incomes are just scanty for buying every day bread and butter, yoo ke gari, rice and beans or kenkey and dried fish; for prices of these commodities escalate every day.

Under five years children are increasingly suffering and dying from the ever-mounting malnutrition and diseases such as respiratory tract infections, diarrhoeal, nutritional Kwashior kor-marasmus and malaria because food production and sanitation has broken down, coupled with acute shortage of trained health services personnel and drugs in hospitals and policlinics. Suggestions for the overhauling and improvement of the present health service system by the introduction of comprehensive primary health care insurance scheme based on National and Social Security Insurance seemed to have fallen on deaf ears because of the nation's precarious financial constraints due to lack of foresight in setting our national priorities right. People's health is and must be No. 1 priority in the national development plans.

The authors strongly believe in taking public health measures (preventive) by organising the whole population to take their own health into their own hands, backed by comprehensive health care and social security insurance policies which will ensure health services for all; irrespective of social class or financial standing of the patients. The solution of our national health problem must start at the base of the society. Domestic agricultural food production and its nutritional food intakes are the first and best natural medicine for living-beings i.e. for man or animal, which we knew in public health practices.

The effective practicing and implementation of knowledge and regulations or laws of family health and education, social-hygiene or environmental sanitation help to act as checks and supplements for the prevention and cure of diseases and for that matter, for the correction or cure of ill-health conditions. Drugs taking had been wrongly equated for effective provision of health services. Drugs to our mind are administered to contain or cure ill-health conditions already established in the human body. Therefore abundant procurement of drugs and medical equipment should not be equated to effective health care or effective public health practices and education.

The child's mental health and physical growth and development therefore depend heavily and powerfully on abundance and qualitative availability of nutritional food, progressive and streamlined medical and public health system based on the overall participation of the people in well planned social and health services at the community base and not at the apex or top. Primary health care at the rural community level or base is the answer to Ghana's evermounting health problems. Ghana has since 1982 adopted the Primary Health Care as the backbone of her health policy backed by effective immunization programme agains the six child killer diseases.

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